



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/668,153

09/24/2003

Ji-Won Sung

P23829

2761

7055 7590 02/20/2007  
GREENBLUM & BERNSTEIN, P.L.C.  
1950 ROLAND CLARKE PLACE  
RESTON, VA 20191

EXAMINER

PAUL, ANTONY M

ART UNIT

PAPER NUMBER

2809

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
--	-------------------	---------------

3 MONTHS

02/20/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/20/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

## Office Action Summary

Application No.

10/668,153

Applicant(s)

SUNG ET AL.

Examiner

Antony M. Paul

Art Unit

2809

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-14 is/are allowed.
- 6) ☒ Claim(s) 1-9, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 15-17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

### **DETAILED ACTION**

**This Office Action is in response to the Application filed on September 24, 2003**

#### **Objection to Specification**

1. The disclosure is objected to because of the following informalities:

Description of the Prior Art section (page 1, line 17), a stroke estimator 5.

Fig.1 in the drawing shows a stroke estimator with a reference number 130, appropriate correction is required.

Specification (page 2, lines 6, 7) a motor constant motor (repetition of the word motor and is unclear, needs to change it to a motor constant)

Specification (page 7, line 7) second stroke estimator (reference number 330 is missing, see drawing, fig.3)

Appropriate correction is required.

#### **Claim Objections**

2. Claim 15-16 are objected to because of the following informalities:

For claim 15, line 1, the sentence "varying the voltage varying". The word varying is repeated and possibly needs to be corrected as "varying a voltage".

Appropriate correction is required.

3. Claim 17 is objected to because of the following informalities:

For claim 17, line 10 the word "of to" is unclear. Appropriate correction is required.

### Claim Rejections – 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-8 and 18-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to claim 1, line 4, the phrase “a voltage” renders the claim indefinite because it is unclear as to what voltage is referring to?

In regard to claim 3, the phrase “the **controller detects** a voltage applied to the both ends of the searching coil when a difference between a phase of the first stroke value and a phase of the current applied to the motor is 90°” renders the claim indefinite because the specification (page 9, lines 3-5) teaches that when a phase detected in the phase difference detector 360 is 90°, the controller 320 applies the voltage which is applied to the both ends of the searching coil **detected by the searching coil voltage detector 350**.

In regard to claim 8, the phrase “x is a piston speed value” renders the claim indefinite because the specification (page 8, line 8) teach, “x is a second stroke estimation value”.

Art Unit: 2809

In regard to claim 18, line 2, the phrase "a second stroke value", renders the claim indefinite because nowhere in the claim teach "a first stroke value".

### **Claim Rejections – 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 9 is rejected under 35 U.S.C. 102(e) as being anticipated by Yoo et al. (US 2004/0066163).

In regard to claim 9, Yoo et al. disclose in fig.3 an operation control apparatus of a reciprocating compressor 100 that estimates a first stroke value ( $X_1$ ) based upon a current and a voltage applied to a compressor motor (page 2, paragraph [0030], lines 6-9) and performs stroke control with the estimated stroke value, the operation control apparatus of a reciprocating compressor 100 comprising:

A searching coil voltage detector 80 (counter electromotive force detector, page 4, paragraph [0043], lines 8-12) that detects a voltage applied to both ends of a searching coil (page 4, paragraph [0043], lines 13-15)

It is inherent that a compressor includes a motor and that the motor has windings or searching coils.

A second stroke estimator 90 that estimates a second stroke value ( $X_2$ ) based upon the counter electromotive force (page 2, paragraph [0030], lines 12-16); and

A controller [30, 40] that compares the second stroke estimation value ( $X_2$ ) with a stroke reference value 10 (output from the stroke reference value determiner) and varies a voltage applied to the motor (page 2, paragraph [0030], lines 29-32) in accordance with a result of the comparison.

As shown in figure 3, the second stroke value ( $X_2$ ) is compared with the first stroke value ( $X_1$ ) using a stroke compensation value calculator 20 and the new compensation value is sent to a stroke reference value determiner 10 for further calculation and again a new stroke reference value is outputted from the stroke reference value determiner 10 to a comparator 30. The comparator 30 compares this new stroke value with a first stroke value ( $X_1$ ) and sends it to a stroke controller 40. This stroke controller 40 controls the stroke of a compressor by varying a voltage applied to the motor on the basis of the difference value outputted from the comparator 30.

Yoo et al. inherently discloses a counter electromotive force extractor that extracts a counter electromotive force based upon the voltage applied to the both ends of the searching coil because at  $I = 0$  (i.e., when the current applied to the motor is zero the voltage value detected is the counter electromotive force  $\alpha \bar{x}$ , which is inputted to the second stroke estimator 90), a counter electromotive force  $\alpha \bar{x}$  is extracted from the counter electromotive force detector 80 (page 4,

Art Unit: 2809

paragraph [0043], lines 4-17). Therefore, a counter electromotive force detector 80 inherently has a counter electromotive force extractor.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

### **Claims Allowed**

5. Claims 10 -14 are allowed.
6. Claim 1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
7. Claim 17 would be allowable if rewritten or amended to overcome the objection(s) set forth in this Office action.
8. The following is a statement of reasons for the indication of allowable subject matter:
  1. For claim 1, the prior art of records fail to show a phase difference detector that detects a phase difference between a phase of the first stroke value and a phase of the current applied to the motor and a searching coil voltage detector that detects a voltage applied to both ends of the searching coil based upon the phase difference detected by the phase difference detector.

Art Unit: 2809

2. For claim 17, the prior art of records fail to show calculating a magnitude of a counter electromotive force when a difference between a phase of the estimated stroke and a phase of the current applied to the motor is  $90^\circ$ .

3. For claim 10, the prior art of records fail to teach about calculating a difference between a phase of the first stroke estimation and phase of the current applied to the motor and judging whether the difference is  $90^\circ$  and detecting a counter electromotive force based upon a voltage applied to both ends of a searching coil when the phase difference <sup>is</sup>  $90^\circ$  and estimating a second stroke value with the counter electromotive force.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antony M. Paul whose telephone number is (571) 270-1608. The examiner can normally be reached on Mon - Fri, 7:30 to 5, Alt. Fri, East. Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 270-1809. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2809

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AP *AP* 1/10/2007STEVEN LOKE  
SUPERVISORY PATENT EXAMINER